

Delta Science Program and the Delta Plan

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The Delta Science Program supports the goals and implementation of the Delta Plan through a commitment to provide high caliber science relevant to the Delta and to invest in new science addressing key informational needs for a changing Delta. The Delta Science Program was established to develop scientific information and synthesis for the state of scientific knowledge on issues critical for managing the Delta system. That body of knowledge must be unbiased, relevant, authoritative, properly integrated and synthesized, and communicated to Delta decision-makers, agency managers, stakeholders, the scientific community, and the public. As identified in the Delta Reform Act, the mission of the Delta Science Program is to provide the best possible unbiased scientific information to inform water and environmental decisionmaking in the Delta. That mission shall be carried out through funding research, synthesizing and communicating scientific information to policymakers and decisionmakers, promoting independent scientific peer review, and coordinating with Delta agencies to promote science-based adaptive management. To support the Delta Plan and the Delta Stewardship Council, the organization of the Delta Science Program is recommended to be in four units, focused on the following topics, with research programs, including competitive grants, science fellows, and directed actions distributed among the four units. Although organized as separate units, a high degree of coordination and communication among units and with other agencies and organizations is essential to the success of the program.

Unit One - Expert Panels, Workshops, Peer Review, and Support of the Delta Independent Science Board:

Ensuring that the science and engineering applied to the Delta is current and of the best quality involves the regular use of expert review panels, topical workshops on key issues, peer review of major plans and reports, and facilitating input from the Delta Independent Science Board (Delta ISB). Strong demand exists for independent and transparent reviews of scientific information by the best available scientists and engineers. This includes expert review panels selected and assigned to review scientific topics of interest in the Delta, topical workshops on emerging science or controversial topics, and the peer review of major plans and reports as they are being developed to assist in generating the best possible product. In addition, the interface and communication links with the Delta ISB must be strong and effective so that the high level review function of this body is carried out effectively. Effective operations of this unit require a program manager and a staff of four scientists.

Unit Two – Delta Plan Early Consultations, Consistency Determinations, Planning of

Adaptive Management, and Adaptive Management Implementation: The Delta Reform Act and Delta Plan call for covered actions to be based on best available science and for ecosystem and water management actions to follow an adaptive management strategy. Science Program staff will address these aspects during early consultations for proposed covered actions and consistency determinations upon appeal for covered actions that impact meeting the coequal goals of a reliable water supply and a healthy Delta ecosystem. The framework to accomplish the co-equal goals, to assess progress towards meeting these goals, and to adjust as new information becomes available is adaptive management. Adaptive management is often called for but only rarely successfully achieved in natural resource management. If adaptive management is going to be an integral part of the Delta Plan, experts in the planning of adaptive management, communication with stakeholders on adaptive management, and facilitating the implementation of projects with good adaptive management protocols need to be on staff of the Delta

Stewardship Council. A unit focused on assisting with early consultations and consistency determinations and providing guidance on adaptive management should include a program manager and five scientists.

Unit Three - Performance Measures, Effectiveness Evaluation, and Science

Communication: The Delta Plan requires a rigorous suite of performance measures to assess and guide progress on the success of the Plan. Performance measures need to be developed, honed, and evaluated on a continuing basis in conjunction with efforts being undertaken by the Interagency Ecological Program (IEP), the Department of Fish and Game's Ecosystem Restoration Program and others. Many of the performance measures will need to be based on high-quality science and engineering. In addition, performance measures must be regularly checked, evaluated, and updated, and the best possible information management (including GIS capability) needs to be employed so that the information is clear, accessible, and informative. Finally, communication of the performance measures and all scientific products linked to the Delta Science Program to the public, stakeholders, and decision-makers requires specialists in communications with scientific acumen. These activities need to be integrated with comparable needs throughout the Delta Stewardship Council. Science staff would include two individuals experienced in developing science-based performance measures, two information managers conversant with information management protocols for large and diverse data streams as used in large science programs nationwide, and two science communication specialists to continue current science communication efforts and to expand public communication of Delta Plan performance to the public. This unit would have a staff of six overseen by a program manager.

Unit Four - Modeling, Analysis, Synthesis, and Integration: Successful application of science to decision-making must link to the modeling, analysis, synthesis, and integration of the very large bodies of scientific information available or coming available for the Delta. This includes the models and evaluation process developed under the Delta Region Ecosystem Restoration Implementation Plan (DRERIP). Existing conceptual models need to be kept current and others developed. Modeling is a critical tool for analysis, synthesis, and integration for a complex system like the Delta. Modeling expertise is needed in the areas of hydrodynamics, ecology, and systems analyses. Three staff modelers with expertise in different modeling methodologies and a commitment to collaborative modeling efforts is critical for supporting the analysis, synthesis, and integration of the large and multidisciplinary data sets from the Delta. In addition, dedicated staff scientists with strong multidisciplinary skills (polymaths) must receive the time and resources to carry out the challenging analysis and synthesis that allows the integration and communication of the science and engineering concerning the Delta. Three talented and multidisciplinary senior scientists are needed to produce the integrated products and communications tools for the decision-makers, stakeholders, and public. A staff of six overseen by a program manager is recommended for this unit.

Research Programs: In addition, scientific research needs to be responsive to primary issues requiring new and additional information in the Delta. Three avenues of research support the research mission of the Delta Science Program. Research components include: 1) competitive grants, 2) science fellows, and 3) directed research projects distributed among the four units described above. The competitive grants program solicits research in topic areas of greatest need for the Delta as identified by stakeholders working with the lead scientist. The science fellows program is an investment in young researchers to carry out needed research in the Delta through support of two-year postdoctoral awards and pre-doctoral awards to graduate students for research within the Delta. The directed actions pathway provides a mechanism to engage the best available experts on specific topics where immediate and short-term information is required to support the Delta Plan. Investment in scientific research supports the goals of each of these four units, and the facilitation of these research programs would be a shared responsibility of the four

units of the Delta Science Program. Recommended annual budgets for each of these research components is \$5M for competitive grants, \$3M for science fellows, and \$2M for directed research projects, for a total annual research program budget of \$10M. The Delta Science Program Lead Scientist will play a key role in directing these research programs and will enlist the aid of the program managers and staff working in each unit. In addition, one program analyst will be needed to assist with grant and contract tracking.

Budget: The recommended structure to the Delta Science Program to support the Delta Stewardship Council and implementation of the Delta Plan includes an independent lead scientist with a science assistant (supported by the United States Geological Survey), a deputy executive officer, an administrative assistant for the Delta Science Program, a program analyst, the four program managers for the four units, and twenty-two staff scientists, engineers and communication specialists. In addition to funding for staff, resources would be allocated to the competitive grants program, the science fellows program, and immediate research needs supported by directed actions as noted above. Estimated annual budget for the Delta Science Program including the four units listed above and for the research programs is \$20M: \$10M for research grants and fellowships; \$7.5M for performance measure support, including performance measure development, filling data collection gaps, data management, modeling, and analysis, synthesis, assessment and reporting; and \$2.5M for science experts, workshops and independent peer review . This level of staffing and funding is in addition to current agency funding for Delta and watershed monitoring, data management, modeling, analysis, synthesis, and reporting.